

DOCKET NO. SA-228

EXHIBIT NO. 17K

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

**FINAL REPORT: SAFETY TESTING OF LI-ION CELLS
MANUFACTURERS X, Y, AND Z**

(BY: U.S. DEPARTMENT OF TRANSPORTATION)

U.S. Department of Transportation

FINAL REPORT

Safety Testing of Li-ion Cells

Manufacturer X



Test # 337

June 28, 2001

Safety Test Summary
Mfg. X
Li-ion Cells
Test # 337

Model A, Cylindrical Cell, 1600 mAh

Drill Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, there was no violent reaction, and the only visible reaction was liquid oozing from the cell. The highest peak skin temperature was 113 °C, while the lowest peak skin temperature was 99 °C.

Drill Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, and removal of the drill bit, there was no visible reaction. The highest peak skin temperature was 116 °C, while the lowest peak skin temperature was 107 °C.

Nail Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, the cells reacted with vapors emanating from, and liquid bubbling at the penetration hole. The highest peak skin temperature was 126 °C, while the lowest peak skin temperature was 113 °C.

Nail Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, the cells reacted with vapors emanating from, and liquid bubbling at the penetration hole. The highest peak skin temperature was 125 °C, while the lowest peak skin temperature was 118 °C.

Model B, Prismatic Cell, 620 mAh

Drill Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, the **first** cell reacted with the expulsion of a few burning particles. The **second** and **third** cells had no visible reaction. The highest peak skin temperature was 105 °C, while the lowest peak skin temperature was 76 °C.

Drill Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, and removal of the drill bit, the only visible reaction was liquid bubbling at the penetration hole. The highest peak skin temperature was 91 °C, while the lowest peak skin temperature was 80 °C.

Nail Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, there was no visible reaction. The highest peak skin temperature was 105 °C, while the lowest peak skin temperature was 104 °C.

Nail Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, the only visible reaction was the dripping of a small amount of liquid from the penetration hole. The highest peak skin temperature was 106 °C, while the lowest peak skin temperature was 105 °C.

ENVIRONMENTAL TESTING LABORATORY

CELL TYPE: MODEL A TEST SPEC NO.: _____
 LOT NO: MFG X 100% S.O.C. TEST #337
 TESTED BY: NCL
 DATE: 6-15-01 DESCRIPTION: DRILL + NAIL
 * OPERATIONAL PACKAGED
 NON-OPERATIONAL UNPACKAGED
 TEST PURPOSE: SAFETY *LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST					POST ENVIRONMENT / FINAL				
DRILL										
1	NO BURNING PARTICLE, ELECTROLYTE OOOZING.					MAX TEMP = 110				
2	NO BURNING PARTICLES, ELECTROLYTE OOOZING.					MAX TEMP = 99				
3	NO BURNING PARTICLES, ELECTROLYTE OOOZING.					MAX TEMP = 113				
NAIL										
4	VAPORS + BURBLING					MAX TEMP = 122				
5	VAPORS + BURIBLING					MAX TEMP = 124				
6	VAPORS + BURBLING					MAX TEMP = 113				

REMARKS: T/C ON BOTTOM

ENVIRONMENTAL TESTING LABORATORY

CELL TYPE MODEL A
LOT NO: MFG. X 50% SOC
TESTED BY: NCL
DATE: 6-15-01

TEST SPEC NO.:

TEST # 337

TESTED BY: NCL

DATE: 6-15-01

DESCRIPTION: DRILL & NAIL

* OPERATIONAL	PACKAGED
NON-OPERATIONAL	UNPACKAGED

TEST PURPOSE: SAFETY

*LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST				POST ENVIRONMENT / FINAL			
DRILL								
1	NO BURNING PARTICLES				MAX TEMP = 116			
2	NO BURNING PARTICLES				MAX TEMP = 114			
3	NO BURNING PARTICLES				MAX TEMP = 107			
NAIL								
4	VAPORS AND LIQUID				MAX TEMP = 121			
5	VAPORS AND LIQUID				MAX TEMP = 125			
6	VAPORS AND LIQUID				MAX TEMP = 118			

REMARKS: T/C ON BOTTOM

ENVIRONMENTAL TESTING LABORATORY

CELL TYPE MODEL B- _____ TEST SPEC. NO.: _____

LOT NO: MFG, X 100% SOC TEST #337

TESTED BY: NAC DESCRIPTION: DRILL & NAIL

DATE: 6-15-01 * OPERATIONAL PACKAGED

DESCRIPTION: DRILL & NAIL

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NON-OPERATIONAL UNPACKAGED

TEST PURPOSE: Safety

*LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST				POST ENVIRONMENT / FINAL			
DRILL								
1	A FEW BURNING PARTICLES,				MAX TEMP = 76 C			
2	NO BURNING PARTICLES				MAX TEMP = 105 C			
3	NO BURNING PARTICLES				MAX TEMP = 100 C			
NAIL								
4	NO REACTION				MAX TEMP = 105			
5	NO REACTION				MAX TEMP = 105			
6	NO REACTION				MAX TEMP = 104			

REMARKS:

ENVIRONMENTAL TESTING LABORATORY

CELL TYPE MODEL B

TEST SPEC NO.:

LOT NO: MFG X 50% SOC TEST #337

TESTED BY: NCL

DESCRIPTION: DRILL & NAIL

DATE: 6-15-01

* OPERATIONAL	PACKAGED
NON-OPERATIONAL	UNPACKAGED

TEST PURPOSE: SAFETY

*LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST				POST ENVIRONMENT / FINAL			
DRILL								
1	NO BURNING PARTICLES, BUBBLING @ 33 Sec				MAX TEMP = 84 C			
2	NO BURNING PARTICLES " "				MAX TEMP = 80 C			
3	NO BURNING PARTICLES, MINOR BUBBLING				MAX TEMP = 91 C			
NAIL								
4	SM. AMT LIQUID				MAX TEMP = 106			
5	SM AMT LIQUID				MAX TEMP = 106			
6	SM AMT LIQUID				MAX TEMP = 105			

REMARKS:

U.S. Department of Transportation

FINAL REPORT

Safety Testing of Li-ion Cells

Manufacturer Y



Test # 339

June 28, 2001

Safety Test Summary

Mfg. Y

Li-ion Cells

Test # 339

Model C, Cylindrical Cell, 1500 mAh

Drill Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, the **first** cell reacted with the expulsion of a lot of burning particles followed by liquid bubbling at the entry hole. The **second** cell, upon penetration, reacted with the expulsion of a lot of burning particles, and smoke emanating from the entry hole. The **third** cell reacted with the expulsion of some burning particles and smoke emanating from the entry hole. The highest peak skin temperature was 107 °C, while the lowest peak skin temperature was 47 °C.

Drill Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, all of the cells reacted with the expulsion of only a few burning particles. The highest peak skin temperature was 37 °C, while the lowest peak skin temperature was 36 °C.

Nail Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, the **first** cell only reacted with a small amount

of liquid oozing from the entry hole, while the **second** and **third** cells exhibited slightly more oozing accompanied by vapors emanating from the entry hole. The highest peak skin temperature was 122 °C, while the lowest peak skin temperature was 119 °C.

Nail Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, all of the cells only reacted with some liquid oozing from the entry hole. The highest peak skin temperature was 125 °C, while the lowest peak skin temperature was 120 °C.

Model D, Prismatic Cell, 875 mAh

Drill Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, the **first** and **second** cells reacted with the expulsion of a few burning particles. The **third** cell reacted with the expulsion of a moderate amount of burning particles. The highest peak skin temperature was 117 °C, while the lowest peak skin temperature was 44 °C.

Drill Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, all of the cells reacted with the expulsion of very few burning particles. The highest peak skin temperature was 124 °C, while the lowest peak skin temperature was 42 °C.

Nail Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, the **first** cell only reacted with a small puff of vapor emanating from the entry hole. The **second** and **third** cells exhibited some liquid oozing, accompanied by vapors emanating from the entry hole. The highest peak skin temperature was 125 °C, while the lowest peak skin temperature was 122 °C.

Nail Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, the **first** cell only reacted with vapors emanating from the entry hole. The **second** cell exhibited some liquid oozing, and the **third** cell only reacted with a small amount of vapor emanating from the entry hole. The highest peak skin temperature was 125 °C, while the lowest peak skin temperature was 119 °C.

ENVIRONMENTAL TESTING LABORATORY

CELL TYPE: MODEL C

TEST SPEC NO.: _____

LOT NO: MFG Y

100% SOC TEST #339

TESTED BY: NCL

DESCRIPTION: DRILL & NAIL

DATE: 6-15-01

* OPERATIONAL PACKAGED

NON-OPERATIONAL UNPACKAGED

TEST PURPOSE: SAFETY

*LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST					POST ENVIRONMENT / FINAL				
DRILL										107
1	A LOT OF BURNING PARTICLES & BURBLING					MAX TEMP = 37				
2	A LOT OF BURNING PARTICLES & SMOKE					MAX TEMP = 47				
3	SOME BURNING PARTICLES & SMOKE					MAX TEMP = 105				
NAIL										
4	NO REACTION. LIQUID OOOZED (SM)					MAX TEMP = 122				
5	NO REACTION. VAPORS. LIQUID					MAX TEMP = 120				
6	VAPORS, OOOZING.					MAX TEMP = 119				

REMARKS: T/C ON BOTTOM

#1 DRILLED TWICE

ENVIRONMENTAL TESTING LABORATORY

CELL TYPE MODEL C _____ TEST SPEC NO.: _____

LOT NO: MFG Y 50% SOC TEST # 339

TESTED BY: NOL DESCRIPTION: DRILL & NAIL

DATE: 6-15-01 DESCRIPTION: SHOOTING
* OPERATIONAL PACKAGED

TEST PURPOSE: SAFETY

*LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST	POST ENVIRONMENT / FINAL
DRILL		
1	A FEW BURNING PARTICLES	MAX TEMP = 36
2	A FEW BURNING PARTICLES	MAX TEMP = 37
3	A FEW BURNING PARTICLES	MAX TEMP = 36
NAIL		
4	NO REACTION. OOZING	MAX TEMP = 120
5	NO REACTION. OOZING	MAX TEMP = 125
6	NO REACTION. OOZING	MAX TEMP = 122

REMARKS: T/C ON BOTTOM (DRILL)

ENVIRONMENTAL TESTING LABORATORY

CELL TYPE: MODEL D TEST SPEC NO.: _____

LOT NO: MFG Y 100% SOC TEST # 339

TESTED BY: NCL DESCRIPTION: DRILL + NAIL

DATE: 6-15-01 * OPERATIONAL PACKAGED

TEST PURPOSE: SAFETY NON-OPERATIONAL UNPACKAGED

*LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST					POST ENVIRONMENT / FINAL				
DRILL										
1	A FEW SPARKS + BURNING PARTICLES					MAX TEMP = 48 C				
2	A FEW BURNING PARTICLES					MAX TEMP = 117 C				
3	MODERATE AMT BURNING PARTICLES					MAX TEMP = 44 C				
NAIL										
	VAPOR									
4	3 SMALL PUFF SPARKS @ 120 C					MAX TEMP = 122				
5	5m PUFF VAPOR + LIQUID @ 2 MIN, 10 SEC					MAX TEMP = 125				
6	BURBIZLING @ 1 MIN 35 SEC. VAPORS					MAX TEMP = 125				

REMARKS:

SPECIALTY BATTERY FACILITY
ENVIRONMENTAL TESTING LABORATORY

CELL TYPE: MODEL D TEST SPEC NO.:

LOT NO: VMFG Y 50% SOC TEST # 339

TESTED BY: NCL DESCRIPTION: DRILL & NAIL

DATE: 6-15-01 DESCRIPTION: OPERATIONAL PACKAGED

TEST PURPOSE: SAFETY

*LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST				POST ENVIRONMENT / FINAL			
DRILL								
1	VERY FEW BURNING PARTICLES				MAX TEMP 72 C			
2	VERY FEW BURNING PARTICLES				MAX TEMP 42 C			
3	VERY FEW BURNING PARTICLES				MAX TEMP 124 C			
NAIL								
4	NO FENG VAPORS.				MAX TEMP = 119			
5	LIQUID OOZING.				MAX TEMP = 125			
6	SM VAPORS				MAX TEMP = 124			

REMARKS:

U.S. Department of Transportation

FINAL REPORT

Safety Testing of Li-ion Cells

Manufacturer Z



Test # 338

June 28, 2001

Safety Test Summary

Mfg. Z

Li-ion Cells

Test # 338

Model E, Cylindrical Cell, 1700 mAh

Drill Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, the **first** cell reacted with the expulsion of a few burning particles, followed by liquid oozing from the entry hole. The **second** cell, upon penetration, reacted the same with the addition of vapors emanating from the entry hole. The **third** cell reacted with the expulsion of a few burning particles and smoke emanating from the entry hole. The highest peak skin temperature was 115 °C, while the lowest peak skin temperature was 111 °C.

Drill Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, the **first** cell reacted with the expulsion of a few burning particles, followed by vapors emanating from the entry hole. The **second** cell, upon penetration, reacted with the expulsion of a few burning particles and liquid oozing from the entry hole. The **third** cell reacted with the expulsion of a few burning particles, smoke, and liquid oozing from the entry hole. The highest peak skin temperature was 119 °C, while the lowest peak skin temperature was 116 °C.

Nail Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, all of the cells reacted with vapors emanating, and liquid oozing from the penetration hole. The highest peak skin temperature was 123 °C, while the lowest peak skin temperature was 119 °C.

Nail Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, all of the cells reacted with vapors emanating, and liquid oozing from the penetration hole. The highest peak skin temperature was 123 °C, while the lowest peak skin temperature was 122 °C.

Model F, Prismatic Cell, 1550 mAh

Drill Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, the **first** and **second** cells reacted with the expulsion of a few burning particles, followed by bubbling of liquid at the entry hole. The **third** cell, upon penetration, expelled only a single spark. The highest peak skin temperature was 115 °C, while the lowest peak skin temperature was 112 °C.

Drill Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, the **first** cell reacted with the

expulsion of a few burning particles, followed by bubbling of liquid at the entry hole. The **second** and **third** cells, upon penetration, exhibited no visible reaction. . The highest peak skin temperature was 123 °C, while the lowest peak skin temperature was 116 °C.

Nail Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, all of the cells reacted with vapors emanating, and liquid oozing from the penetration hole. The highest peak skin temperature was 123 °C, while the lowest peak skin temperature was 119 °C.

Nail Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, all of the cells reacted with a small to moderate amount of liquid oozing from the penetration hole. The highest peak skin temperature was 116 °C, while the lowest peak skin temperature was 114 °C.

Model G, Prismatic Cell, 600 mAh

Drill Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, the **first** cell reacted with only a small puff of smoke. The **second** cell expelled a single burning particle. The **third** cell, upon penetration, exhibited no visible reaction. The highest peak skin temperature was 116 °C, while the lowest peak skin temperature was 73 °C.

Drill Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Drill Penetration test. The cells were completely penetrated by a 3/16 inch steel jobbers drill bit. The cell skin temperature was continuously monitored during the test period. Upon penetration, none of the cells exhibited any visible reaction. The highest peak skin temperature was 126 °C, while the lowest peak skin temperature was 112 °C.

Nail Penetration Test @ 100 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, none of the cells exhibited any visible reaction. The highest peak skin temperature was 114 °C, while the lowest peak skin temperature was 108 °C.

Nail Penetration Test @ 50 % State of Charge

Three (3) cells were subjected to a Nail Penetration test. The cells were completely penetrated by an eight-penny nail. The cell skin temperature was continuously monitored during the test period. Upon penetration, all of the cells exhibited liquid oozing from the entry hole. The highest peak skin temperature was 118 °C, while the lowest peak skin temperature was 103 °C.

ENVIRONMENTAL TESTING LABORATORY

CELL TYPE: MODEL E

LOT NO: , MFG Z 100% SOC

TESTED BY: NCL

DATE: 6-15-01

TEST PURPOSE: SAFETY

TEST SPEC NO.: _____

TEST # 338

DESCRIPTION: DRILL + NAIL

* OPERATIONAL	PACKAGED
1. <u>OPERATIONAL</u>	1. <u>PACKAGED</u>
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100. <u>OPERATIONAL</u>	100. <u>PACKAGED</u>

NON-OPERATIONAL UNPACKAGED

*LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST				POST ENVIRONMENT / FINAL			
DRILL								
1	FEW BURNING PARTICLES, OOZING				MAX TEMP = 115			
2	FEW BURNING PARTICLES, OOZING, VAPORS				MAX TEMP = 114			
3	FEW BURNING PARTICLES, SMOKE				MAX TEMP = 111			
NAIL								
4	VAPORS, LIQUID OOZING				MAX TEMP = 123			
5	VAPORS, LIQUID OOZING				MAX TEMP = 119			
6	VAPORS, LIQUID OOZING				MAX TEMP = 119			

REMARKS: T/C ON BOTTOM (DRILL)

ENVIRONMENTAL TESTING LABORATORY

CELL TYPE: MODEL E

TEST SPEC NO.: _____

LOT NO: MFG Z 50% SOC

TEST #338

TESTED BY: NCL

DESCRIPTION: DRILL + NAIL

DATE: 6-15-01

* OPERATIONAL PACKAGED

NON-OPERATIONAL UNPACKAGED

TEST PURPOSE: SAFETY

*LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST					POST ENVIRONMENT / FINAL				
DRILL										
1	A FEW BURNING PARTICLES, VAPORS					MAX TEMP = 116				
2	A FEW BURNING PARTICLES, OOZING					MAX TEMP = 118				
3	A FEW BURNING PARTICLES, SMOKE, OOZING					MAX TEMP = 119				
NAIL										
4	NO VISIBLE REACTION. VAPORS, OOZING					MAX TEMP = 122				
5	VAPORS, OOZING					MAX TEMP = 123				
6	VAPORS, OOZING					MAX TEMP = 123				

REMARKS: T/C ON BOTTOM (DRILL)

ENVIRONMENTAL TESTING LABORATORY

CELL TYPE: MODEL F TEST SPEC NO.: _____
 LOT NO: MFG 8 100% SOC TEST #338
 TESTED BY: NOL DESCRIPTION: DRILL & NAIL
 DATE: 6-15-01
 TEST PURPOSE: SAFETY
 * OPERATIONAL PACKAGED
 NON-OPERATIONAL UNPACKAGED
 *LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST					POST ENVIRONMENT / FINAL				
DRILL										
1	A FEW BURNING PARTICLES & BUBBLING					MAX TEMP = 115				
2	A FEW BURNING PARTICLES & BUBBLING					MAX TEMP = 114				
3	A SINGLE SPARK					MAX TEMP = 112				
NAIL										
4	VAPORS & OZZING LIQUID					MAX TEMP = 113				
5	VAPORS & OZZING LIQUID					MAX TEMP = 115				
6	VAPORS & OZZING LIQUID					MAX TEMP = 112				

REMARKS: T/C UNDER CELL

ENVIRONMENTAL TESTING LABORATORY

CELL TYPE: MODEL F TEST SPEC NO.: _____

LOT NO.: MFG Z 50% SOC TEST # 338

TESTED BY: NOL DESCRIPTION: DRILL + NAIL

DATE: 6-15-01 * OPERATIONAL PACKAGED

TEST PURPOSE: SAFETY NON-OPERATIONAL UNPACKAGED

*LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST					POST ENVIRONMENT / FINAL				
DRILL										
1	A FEW BURNING PARTICLES + BUBBLING					MAX TEMP = 116				
2	NO BURNING PARTICLES					MAX TEMP = 120				
3	NO BURNING PARTICLES					MAX TEMP = 123				
NAIL										
4	SM AMT LIQUID					MAX TEMP = 116				
5	MODERATE AMT LIQUID					MAX TEMP = 114				
6	MODERATE AMT LIQUID					MAX TEMP = 114				

REMARKS: T/C BOTTOM OF CELL

ENVIRONMENTAL TESTING LABORATORY

CELL TYPE: MODEL G _____ TEST SPEC NO.: _____

LOT NO: MFG X 100% SOC TEST #338

TESTED BY: NCE DESCRIPTION: DRILL & NAIL

DATE: 6-15-01 DESCRIPTION: OPERATIONAL PACKAGED

TEST PURPOSE: SAFETY

*LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST				POST ENVIRONMENT / FINAL			
DRILL								
1	SM PUFF OF SMOKE				MAX TEMP = 73			
2	1 BURNING PARTICLE, SM				MAX TEMP = 76			
3	NO BURNING PARTICLES				MAX TEMP = 116			
NAIL								
4	NO REACTION. NO ELECTROLYTE LEAKAGE				MAX TEMP = 114			
5	NO REACTION. NO ELECTROLYTE LEAKAGE				MAX TEMP = 108			
4	NO REACTION. NO ELECTROLYTE LEAKAGE				MAX TEMP = 109			

REMARKS: # 3 BEGAN W/ T/C UNDER CELL

ENVIRONMENTAL TESTING LABORATORY

CELL TYPE: MODEL G 1

TEST SPEC NO.: _____

LOT NO: MFG Z 50 % SOC

TEST #338

TESTED BY: NCL

DESCRIPTION: DRILL & NAIL

DATE: 6-15-01

* OPERATIONAL	PACKAGED
NON-OPERATIONAL	UNPACKAGED

TEST PURPOSE: SAFETY

*LOAD: _____

SERIAL NO.	INITIAL / PRE-TEST				POST ENVIRONMENT / FINAL			
DRILL								
1	NO	BURNING PARTICLES					MAX TEMP =	126
2	NO	BURNING PARTICLES					MAX TEMP =	123
3	NO	BURNING PARTICLES					MAX TEMP =	112
NAIL								
4		LIQUID OZZING					MAX TEMP =	103
5		LIQUID OZZING					MAX TEMP =	119
6		LIQUID OZZING					MAX TEMP =	118

REMARKS: T/C UNDER CELL